

CENTERVIEWS

Air Force Center for Engineering and the Environment | Lackland AFB, Texas

October–December 2011, Vol. 17, No. 4

Protecting through partnerships

Page 22



What's Inside...

Column

View from the Center

04 *Programs ensure clean, green installations*

Preventing Pollution

05 Winning the war against waste

07 Storm water runoff jeopardizes clean water supplies

09 Air Force focuses on sustainable remediation

12 Installations eyed as sustainability test beds

14 Healthy ecosystems give back

16 AFCEE subject matter expert takes work mindset home

18 Site pollution resolved during construction on Travis AFB

20 Going green starts with deconstruction

22 Tinker AFB and school partner up

23 Scrap metal brings in big bucks

24 Experts in their fields

Energy Awareness

27 Energy awareness, reduced usage daily endeavor at AFCEE

29 AFCEE supplies MMR with clean energy

30 Air Force awarded for energy savings

Other News

32 Installations protect mission, feathered inhabitants

33 AFCEE contributes to mission in Afghanistan with new military university



On the cover:

Dr. Janet Barresi, state superintendent of public instruction in Oklahoma, helps Grove Valley Elementary School students plant native grasses as part of a partnership between the school and Tinker Air Force Base, Okla., to replace a wetland and establish a field classroom.



Director
Mr. Terry Edwards

Deputy Director
Col. David W. Funk

Civilian Deputy Director
Mr. Harry F. Finke

Chief of
Operations Support
Ms. Christine O'Brien

Chief of Public Affairs
Mr. Michael Briggs

Editor
Ms. Jennifer Schneider

Editorial office:
HQ AFCEE/OSR
2261 Hughes Ave. Ste. 155
Lackland AFB, Texas 78236-9853
Telephone: (210) 395-8524
DSN: 969-8524
Fax: (210) 395-9525 Attn: AFCEE/OSR
E-mail: afcee.pa@us.af.mil

Visit *CenterViews* on the Web at www.afcee.af.mil/media/index.asp

CenterViews is published quarterly as a funded newspaper by Strategic Communications, Air Force Center for Engineering and the Environment, Lackland AFB, Texas. It is an authorized publication for members of the U.S. military services. Contents of *CenterViews* are not necessarily the official views of or endorsed by the U.S. government, the Department of Defense or the Department of the Air Force. Reference to any commercial product or firm does not imply endorsement by the U.S. government or any of its agencies. All pictures appearing in *CenterViews* are U.S. Air Force photos unless otherwise noted. Readers are invited to submit articles, photographs and other items for publication. All material, however, will be edited to conform to the standards set forth in Air Force Instruction 35-101 and the Associated Press Stylebook and Libel Manual. Suggestions and criticisms are also welcome.





Above: Contractors load recyclable building material at Peterson Air Force Base, Colo. Over 550 tons of steel were diverted from the landfill and repurposed. Photo by Daniel Sciarra. See related story on page 20.

Left: Thule Air Base, Greenland, received more than \$1 million for recycling a 15,000-ton metal scrap pile. U.S. Air Force photo by Todd DeGarmo. See related story on page 23.



Left: Safeguarding and creating healthy ecosystems provide benefits that are far-reaching, such as food supplies, fresh water, air and climate regulation, flood control and much more. See related story on page 14.



Above: The declining number of burrowing owls across the United States poses a unique problem for Air Force installations, where officials are looking for ways to protect and support the birds while carrying on mission-essential activities. See related story on page 32.

Left: Workers assemble the first wind turbine at the Massachusetts Military Reserve, Mass. Two additional wind turbines are currently under construction and will be operational soon, resulting in "100 percent on-site renewable" status for the installation. See related story on page 29.



Programs ensure clean, green installations

By Terry Edwards
Director



Much of the attention the Air Force receives concerning its environmental management program focuses on what we're doing to clean up contamination from decades-old practices that were not environmentally friendly.

I'm proud of the work the members of the Air Force Center for Engineering and the Environment perform on behalf of the Air Force in the areas of compliance, conservation and pollution prevention. It is a positive legacy we leave to Airmen and their families for generations to come and fosters excellent installations that deliver mission capability. We are nothing in terms of a fighting force if we are not free to execute our national defense missions when called upon to do so. Because of the diligence of the AFCEE team and successful accomplishment of the environmental program in the field, we help installations meet compliance and other mandates to ensure our bases are force multipliers, not force inhibitors.

As our programs mature and we benchmark best practices, we are gaining efficiencies of money and time while executing our environmental stewardship mission at a higher level. We will continue to embrace advancements that gain further efficiencies, strive for continuous improvement and never lose sight of the fact that we are here to support the Airmen who put themselves in harm's way every day to keep America free.

In the pages that follow, you will read about several of AFCEE's subject matter experts who provide guidance and advice on myriad programs such as pollution prevention, air quality, water quality and

natural resources, to name a few. You will also learn about several new initiatives and get updates about the progress and new direction of some ongoing programs. These stories will not only explain the compliance, conservation and pollution prevention programs, they will also show the breadth of involvement and the magnitude of work the Air Force is accomplishing across a

"We will continue to embrace advancements that gain further efficiencies, strive for continuous improvement and never lose sight of the fact that we are here to support the Airmen who put themselves in harm's way every day to keep America free."

broad spectrum of operations as it maintains its stellar environmental stewardship reputation.

I hope you find this issue of the CenterViews both beneficial and enjoyable. □

Stay up to date on the latest news from AFCEE



Visit our website
AFCEE.af.mil



Like us on Facebook
Facebook.com/AFCEE



Follow us on Twitter
Twitter.com/USAFCEE



Visual used in an earlier Win the War Against Waste campaign. A new campaign will be rolled out by the end of the year.

WINNING THE WAR *against* WASTE

By Chad Starr
Public Affairs

They say the third time's the charm, and that's exactly what Nancy Carper, integrated solid waste management specialist at the Air Force Center for Engineering and the Environment, hopes.

She's getting ready to launch the third edition of the Air Force's "Win the War Against Waste" tool kit. Win the War Against Waste is the name of the outreach campaign AFCEE developed to support the Air Force's worldwide environmental objectives for solid waste management.

"I did the initial launch back in 2000-2001 and continuously work to improve the tool kit," Carper said. "This will be the third update and will be available to installations for use in their solid waste management programs by the end of this year."

While the earlier versions are still available, new tools are being added to the kit for this edition, according to Carper.

"I'm excited about adding a new feature to the tool kit—public service announcement videos. They deliver a message for everybody, but they target our younger Airmen by using a spin-off from the popular Transformer franchise which we have named Trashformer," Carper said.

The Air Force-wide Win the War Against Waste campaign is an ongoing initiative to educate Air Force personnel, including active duty, civilian employees, contractors and family members, on the importance of integrated solid waste management activities on their installations and encourage their personal involvement.

The program supports Air Force efforts to meet the Department of Defense strategic sustainability performance plan goal of diverting 50 percent of non-hazardous solid waste, not including construction and demolition waste, by 2015 and thereafter, Carper said. The target for 2012 is a 44-percent reduction, and 46 percent for 2013.

According to the latest Environmental Protection Agency statistics, in 2009 Americans generated about 243 million tons of waste, with the average person

generating 4.34 pounds of waste per day. Eighty-two million tons were recycled and composted, equivalent to a 33.8 percent recycling rate. On average, Americans recycled and composted 1.46 pounds of their individual waste generation of 4.34 pounds daily. Recycling in 2009 prevented about 178 million metric tons of carbon dioxide from being released, the equivalent of the annual emissions of 33 million cars.

There has been significant progress, but there's still more to do, Carper said. In 1980, 89 percent of Americans' waste wound up in a landfill, according to the EPA. Only 54 percent wound up there in 2008.

Waste doesn't just occur when a product is thrown away or hauled to the local landfill, however. It is generated throughout the life cycle of the product, from extraction of the raw materials required to manufacture an item and transporting those materials, to the processing, manufacturing facilities and energy used to make it and the distribution systems used to distribute it.

The Can Manufacturers Institute said the average American employee consumes 2.5 cans of soda each day at work, and the aluminum can industry can make up to 20 cans from recycled aluminum with the same amount of energy it takes to make one completely new can.

"When you take an aluminum can and reprocess it, it generates a lot less waste than producing another aluminum can from raw materials," Carper said.

"Recycling is pollution prevention, absolutely," said Carper. "But we tend to only focus on recycling when there's much more involved in winning the war against waste. It also includes reuse of materials, composting and source reduction—reduce, recycle, reuse."

Reduction means reducing the amount of waste produced or reducing toxic substances in the waste.

The most effective way to reduce waste is to not create it in the first place. One way to do that is by using reusable products to reduce the number of items manufactured.

"We buy so many things with so much packaging, from personal items to the little condiment packages you get at fast food places, and all this is going into the waste stream," said Carper.

Reusing items, or producing them with less material or packaging decreases waste dramatically resulting in fewer materials requiring recycling, combusting for energy or winding up in landfills.

Tools of the trade...

The Win the War Against Waste tool kit provides outreach materials to help installations keep their campaigns fresh as they move towards achieving higher levels of waste diversion. It includes:

- **Logo** – A full color logo in .jpeg format.
- **Magnet** – Two graphics suitable for flat magnet production in standard .PDF format.
- **Newspaper articles** – Five articles dealing with specific environmental events or general topics that tend to create large amounts of waste like moving or the holiday season.
- **Posters** – Three posters that focus on different aspects of the campaign.
- **Banner** – Two graphics suitable for producing banners for display at the installation.
- **Public service announcements** – Two video public service announcements.

The average American office worker, for example, uses about 500 disposable cups every year according to Clean Air Council reports. Additional waste is created by manufacturers to replenish those items, when all the waste could be prevented by workers simply using reusable beverage containers.

On a larger scale, a new area of focus has been reusing or recycling construction material and debris on Air Force installations. When a new \$43 million dollar runway was being designed at Fairchild AFB, Wash., the plan included recycling 60,000 tons of concrete and about 20,000 tons of asphalt from the existing runway.

"Reduce, recycle, reuse. To win the war against waste we need to continue to educate our Air Force on how they can contribute to the fight and show them that their efforts, large or small, can make a difference," Carper said. "The tool kit is one way we try to do that."

Additional information on the Win the War Against Waste campaign and the tool kit can be found at <https://cs.eis.af.mil/a7cportal/eDASH/Web%20Part%20Pages%20%20Programs/Solid%20Waste%20Management%20and%20Recycling.aspx>. The site is accessible to anyone with a government common access card. □

Storm water runoff jeopardizes clean water supplies

By Debbie Aragon
Public Affairs

Something as simple as washing your car in your driveway or neglecting to pick up your yard after your pets can contribute to turning a favorite lake for swimming into a health and environmental hazard.



Polluted storm water runoff, from business operations as well as homes, is a leading cause of impairment to the nearly 40 percent of surveyed U.S. water bodies that don't meet water quality standards, according to the Environmental Protection Agency.

Storm water runoff is generated when precipitation from rain and melted snow flows over surfaces and isn't absorbed by the ground. As it moves, it accumulates debris such as chemicals, sediment or other pollutants that could adversely affect water quality if left untreated, according to the EPA.

To emphasize the importance of storm water runoff, the EPA recently announced its enforcement focus areas for fiscal 2012 with the number one area being storm water compliance.

Reducing storm water pollutants through laws, enforcement and education isn't a new focus for the EPA and other agencies, said Larry Isaacs, the Air Force Center for Engineering and the Environment's water quality subject matter expert.

"There was general renewed interest by the public for cleanliness of natural waters in the United States as far back as the 70s," he said.

In 1972, congress passed the Federal Water Pollutions Control Act, also known as the Clean Water Act.

Although it didn't originally address storm water pollutants, the act was amended later that year to include the National Pollutant Discharge Elimination System, or NPDES.

NPDES, a program under the Clean Water Act, controls water pollution by preventing pollutants from entering waters of the United States.

Permits for municipal separate storm sewer systems, or MS4, started in 1990 and includes Air Force bases in urbanized areas, said Michael Hanson, AFCEE technical division intern.

According to NPDES, there are three potential sources of polluted discharges; storm sewer systems, construction and industrial activities.

As it conducts its operations, the Air Force has the potential to contribute to all three, Hanson said.

To comply with federal mandates and prevent storm water pollutants from making it into water ways, AFCEE and the Air Force have detailed programs in place.

For example, AFCEE experts help installations and construction agents comply to maintain or restore predevelopment storm water hydrology with regards to temperature, rate, duration and flow, Isaacs said.

Air Force installations carefully manage and recover deicing chemicals where possible so they don't enter the storm water system and subsequently any waters of the United States.

The service also uses comprehensive spill prevention control and countermeasure plans, or SPCCs, to prevent petroleum, oils and lubricants, or POL, from being released into our nation's waters, said Isaacs.

POL spills, when they occur, are reported through the spill incident reporting system, or SIRIS, to the installation's respective major command who in turn submits a report to headquarters Air Force if the release potentially harms individuals, the environment or generates public media attention. This reporting assists major commands and Air Force leaders to provide resources to quickly respond and contain any POL release to protect waters of the United States. SIRIS reports are accessible to Air Force users on the AF/A7C portal at <https://www.my.af.mil/accgeoprod4/a7a/siris/default.aspx> by using a common access card, or CAC.

Additionally, installations maintain storm water pollution prevention plans, or SWPPPs, that institute best management practices to control releases of pollutants to storm water.

Although big business is a greater contributor to polluted water ways than individual citizens, everyone can do his or her part to keep America's lakes, rivers, streams and coastal waters clean.

Here are some tips from Isaacs, Hanson and the EPA to help prevent storm water pollution in your neighborhood:

- Use fertilizers and pesticides sparingly or use less harmful varieties. Using these chemicals in excess often doesn't provide additional protection. Instead, they're washed into the storm water system during routine watering or when it rains.
- Don't drain pool water into the street, alleyway or other right of way.
- When landscaping, select plants that are native to your environment. They require less water and are better equipped to fight off common pests and diseases. Soil erosion is also a source of storm water contamination. Avoid this by covering bare non-vegetated grounds with xeriscape materials and native plants.
- Make sure sprinkler heads aren't spraying onto sidewalks or driveways since the overspray flows directly into the storm water system and costs you money.
- Use a broom, not a hose, to clean driveways and other paved outdoor surfaces. This not only conserves water and saves money on your water bill; it prevents dirt and debris from entering the storm water system as well.
- Never dump used motor oil into the storm water system. Many automotive supply and maintenance locations provide disposal of used motor oil free of charge. Visit the Earth 911 website at <http://earth911.com/recycling/automotive/> to find waste oil recycling drop-off locations near you. Properly dispose of other automotive waste as well including engine coolant, car batteries, tires and brake pads.
- Don't wash your car in the street and allow the dirt and oils from this process to drain into storm waters; use a vehicle wash rack designed for this purpose. Also, be sure to keep your vehicle free of leaks, and place a drip pan or adsorbent material beneath any leaks until they can be fixed.
- Never dispose of the following products in the storm water system, regular garbage collection or down the drain. Cleaning products such as multipurpose cleaners, oven cleaner, floor cleansers, furniture polish, drain cleaner or carpet cleaning products. Car care and maintenance products such as motor oil, battery acid, gasoline, car cleaner, car wax, engine cleaner, degreasers, radiator flushing products, rust preventative or antifreeze and coolant. Home improvement products such as paints, wood preservatives, strippers, brush cleaners and solvents or other products labeled as toxic, flammable, corrosive or containing lye, phenols, petroleum, distillates or pesticides.
- Pickup your yard after your animals to prevent their pet waste from being washed into storm water drains. Pet waste containing diseases and harmful bacteria can mix with rainwater and cause storm water pollution, posing a health risk to people and other animals.

To learn more about storm water and AFCEE's role in compliance, visit www.afcee.lackland.af.mil/water/. More information on the nation's storm water program is also available at the EPA's website at http://cfpub.epa.gov/npdes/home.cfm?program_id=6.

Cleaner, greener cleanups

Air Force focuses on sustainable remediation



Photo courtesy of Parsons Corporation.

By Chad Starr
Public Affairs

When most people hear the term “environmental cleanup” they think it’s all about eliminating pollution by cleaning up contaminated soil and water. Traditional environmental remediation approaches, however, can often impact the very environment undergoing cleanup by contributing additional pollution. For example, remediation equipment typically operates on diesel, increasing greenhouse gas emissions. Remediation efforts can also generate significant amounts of waste, change site hydrology, create changes in ecosystem structures and consume natural resources.

A shift in awareness and focus throughout the Air Force, industry and the general public has resulted in a new approach to environmental restoration, called green and sustainable remediation or GSR,

where the emphasis is on incorporating sustainable environmental practices into remediation of contaminated sites. GSR expands upon environmental practices already in use to include new cleanup strategies that reduce negative impacts on the environment, efficiently use natural resources and energy, eliminate or minimize pollution at the source, reduce waste, benefit the community and maximize the benefit of the cleanup by minimizing environmental footprints.

In applying the GSR approach, environmental restoration planners consider the environmental impact of an investigation and remedy activities during remedy selection, design, operation and maintenance and site closeout. GSR was driven, in part, by Executive Order 13423 which states that federal agencies “shall conduct their environmental and energy-related activities in an environmentally sound and sustainable manner.”

Remediation designs, technology selections and environmental remedy process optimization primarily focus on cost, risk reduction and compliance with existing laws and metrics. Installation restoration program managers must also consider the short- and long-term environmental effects associated with remediation activities. By incorporating GSR into such considerations, program managers are applying a broader, more complete approach making decisions that minimize the overall remediation project environmental impact and reducing the potential for pollution in the remediation process.

GSR results in effective cleanups, minimizing the environmental and energy footprints of site cleanup and revitalization according to the U.S. Environmental Protection Agency. By including sustainability in an environmental restoration program, several new metrics can become part of the restoration process, such as evaluating greenhouse gas emissions, energy consumption, worker safety and resource service for land and/or groundwater.

Key elements of GSR include minimizing energy use for treatment systems; water use and impacts on water resources; material consumption and waste generation; impacts on land and ecosystems; and air emissions. While GSR supports achieving remedial action goals, it also promotes pollution prevention efforts. GSR objectives include reducing total pollutant and waste burdens on the environment, reducing air emissions and GHG production, conserving natural resources and minimizing impacts to water quality and water cycles.

The Air Force has adopted GSR into its environmental restoration program and has incorporated GSR technologies and methodologies as part of a holistic approach to make environmental cleanup more sustainable. Air Force goals include accelerating greener remedy-in-place; augmenting current remedies to achieve site closure; lowering capital, operations and maintenance costs; moving from energy-consumptive to energy-efficient technologies; and promoting education and transfer of successful GSR solutions and lessons learned.

Incorporating more sustainable cleanup approaches in Air Force environmental restoration projects is not necessarily a new concept, according to Erica Becvar, a physical scientist with the Air Force Center for Engineering and the Environment.

“You prevent further pollution by consciously thinking about that when you’re doing your remedial action. Pollution prevention is not a stove-pipe. It’s not a program all unto itself. It’s a tool you can use in your environmental management system.”

Erica Becvar
AFCEE physical scientist



“For several years AFCEE has investigated and promoted monitored natural attenuation and enhanced in situ bioremediation. These treatments, although not originally targeted for their sustainability, are inherently sustainable and are generally considered green remediation technologies. Incorporating them into an environmental restoration program can often reduce the environmental impact of the remediation activity itself,” she said.

AFCEE has integrated GSR initiatives by exploring, developing and implementing GSR technologies and tools for cleaning up Air Force contaminated soils and groundwater, Becvar said.

Historically, the approach to contaminated sites did not fully consider sustainability concepts when making remedial decisions. To aid environmental professionals in incorporating sustainability concepts into their remediation decision-making process, AFCEE developed, tested and released the sustainable remediation tool, or SRT. The SRT is designed to evaluate particular remediation technologies on the basis of sustainability metrics. It calculates GHGs, total energy use by projects and other sustainability metrics for optimized, greener cleanups of soil and groundwater, said Becvar, who led the SRT project team.

“It replaces best-guess qualitative concepts with quantitative, real-world data that can be used in making GSR decisions, incorporating sustainability concepts into environmental cleanup projects,” Becvar said.

The SRT, free and available to all, is designed to help plan for future implementation technologies at a particular site, as well as evaluate sustainability of

remediation technology systems already in place. It provides environmental planners a way to compare remediation approaches based on sustainability metrics for specific technologies including excavation, soil vapor extraction, pump and treat, enhanced in-situ biodegradation and more.

To minimize pollution and achieve remedial action goals with the least impact to the environment, several considerations should be included in the design of a remediation project.

GHG emissions can be reduced by selecting power machinery and equipment that operate using clean fuels, or using renewable energy sources such as solar, wind and methane. Consumption of energy, including fuels and electricity, is often a significant component of a cleanup remedy. Utilizing remedies that reduce energy consumption increase the sustainability of a project, and the reductions can help meet strategic sustainability performance plan goals.

Remedies can require large amounts of water. Selecting a remedy that minimizes the amount of water required and maximizes water reuse preserves natural resources. Other considerations include retaining native vegetation and soils, reusing or recycling deconstruction and demolition materials, protecting water resources from runoff and contamination and incorporating natural systems to manage stormwater like green roofs, landscaped swales and engineered wetlands.

Waste is often a by-product of remediation, including investigation-derived waste. A green and sustainable remedy endeavors to minimize the usage of these chemicals to maximize environmental benefits. Considerations include reclaiming treated water for beneficial use such as irrigation, minimizing dust export of contaminants by spraying with reclaimed water, preventing impacts such as nutrient loading on water quality in nearby water bodies, minimizing bioavailability of contaminants through contaminant source and plume controls, and using technologies designed to minimize waste generation.

The Air Force leads the Department of Defense in use of green remediation methods such as monitored natural attenuation and solar and wind-powered cleanup projects, said Becvar.

“By emphasizing GSR in optimization and contracted cleanup efforts, the Air Force has turned off 22 high-

energy groundwater treatment systems over the past three years,” Becvar said. “Over 50 percent of Air Force cleanup projects use low-energy, low-impact technologies. Examples include phytoremediation, liquid non-aqueous phase liquid recovery, passive in situ treatment, wetlands, enhanced bioremediation, monitored natural attenuation, biowalls and passive sampling.”

AFCEE is also incorporating GSR-related contract language for selection criteria in Air Force performance-based remediation contracts and other contracting mechanisms.

The next step, said Becvar, is to look at folding the Air Force cleanup program into the environmental management system and include it in environmental, safety and occupational health compliance assessment and management program audits.

“Although we have made great progress in GSR, as I’m learning EMS, I’m realizing we haven’t fully taken advantage of using an EMS approach in managing the potential environmental impact from restoration activities,” said Becvar. “Nowhere in the executive order does it say you have to be sustainable in restoration programs or cleanup. It says all environmental programs—that includes restoration. You prevent further pollution by consciously thinking about that when you’re doing your remedial action. Pollution prevention is not a stove-pipe. It’s not a program all unto itself. It’s a tool you can use in your environmental management system.”

Additional information on green, sustainable remediation and the sustainability remediation tool can be found on the AFCEE website at afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation. □

INSTALLATIONS EYED AS SUSTAINABILITY 'TEST BEDS'

By Jennifer Schneider
Public Affairs

With energy awareness at the forefront this month, the Department of Defense, with its two environmental research programs, is uniquely positioned to support energy conservation and promote sustainable technologies.

The strategic environmental research and development program and the environmental security technology certification program focus on harnessing the latest science and technology to develop and demonstrate innovative, cost-effective and sustainable solutions for the DOD.

Military installations are uniquely positioned to serve as "test beds" for emerging energy technologies and "green" initiatives, said Dr. Jeffrey Marqusee, SERDP and ESTCP director.

Each of the five program areas within SERDP and ESTCP focus on a specific component of the DOD's environmental responsibilities: energy and water, environmental restoration, munitions response, resource conservation and climate change, and weapons systems and platforms. Program technical committees are comprised of representatives from each of the military services, as well as the Environmental Protection Agency and the Department of Energy.

While there are differences across the two programs, they both support the same goal: a sustainable DOD.

"SERDP is the research arm of the DOD program while ESTCP is more involved in technology transfer," said Dr. Dan Friese, natural resource specialist and AFCEE's SERDP and ESTCP representative for the conservation and climate change technical committee.

"The Department of Defense has historically been a first adopter of technology," said Paula Shaw, AFCEE engineer and Air Force subject matter specialist for sustainable design and development. Shaw also represents AFCEE on the ESTCP energy and water technical committee.

AFCEE plays an active role in both programs, with agency representatives participating on technical committees for all of the program areas except weapons systems, said Dr. Hunter Anderson, AFCEE's SERDP and ESTCP coordinator and representative for the environmental restoration technical committee.

In addition to Friese, Shaw and Anderson, several other AFCEE technical experts are included on other



**Partners in Environmental Technology
Technical Symposium & Workshop**

Nov. 29 - Dec. 1, 2011

Washington, D.C.

<http://symposium2011.serdp-estcp.org/>

Registration closes Nov. 16, 2011



SERDP and ESTCP committees. Dr. Paul Jurena is on the environmental restoration committee, and Jon Ussery and Jon Haliscak are on the munitions response committee.

To support technological advances and achieve solutions to the DOD's environmental challenges, the DOD-funded SERDP and ESTCP issue annual solicitations for proposals from the federal government, academia and industry. The proposals are reviewed by technical committees who assess the technical quality of proposals and projects and adherence to the stated need.

"We look at these pre-proposals and evaluate them to ensure they meet requirements and have technological merit," Friese said. "We rack and stack them against each other. If the project has merit, we request a full proposal and presentation. We then select the ones that are in the top tier for possible funding."

More than 100 SERDP and ESTCP fiscal 2011 projects were funded, including a project spearheaded by Christopher Kruzel of AFCEE's built infrastructure branch. His "Sustainable Communities" project strives to demonstrate the ability to apply a standardized sustainability rating system to a DOD installation. This, in turn, allows installation commanders to prioritize investments using asset management principles and assess sustainability progress.

"The ultimate goal is that you'd be able to assess the sustainability of an installation holistically and you'd be able to give the installation strategies to reduce energy

consumption," Kruzel said. "It's intended to be flexible, so an installation can pick and choose what it wants to do. It is an assessment and will measure how much an installation is improving year by year."

Sustainable communities is a rating system that uses 10 categories and a combination of requirements and credits to show compliance with federal mandates and document best practices. As part of the rating system, certain credits will have an investment model associated with it for prioritization purposes.

The project is expected to reduce the labor hours associated with reporting and enable installation commanders to demonstrate meeting sustainability requirements by prioritizing actions based on life-cycle return on investment, a requirement of Executive Order 13514, Federal Leadership in Environmental, Energy and Economic Performance. Plans are underway to demonstrate the project at three DOD installations early next year: Naval Base Ventura County, Calif., Fort Carson, Colo., and the Air Force Academy, Colo.

With the emphasis on energy conservation this month, ESTCP and SERDP projects such as sustainable communities help support the military's directives to reduce energy consumption, said Kruzel. □



U.S. Air Force photo by Samuel King, Jr.

Healthy ecosystems **GIVE BACK**

By Jennifer Schneider
Public Affairs

Healthy ecosystems provide a wide array of benefits enjoyed by humans and other species.

The services rendered by a healthy ecosystem are numerous and complex, with many of them so subtle that their true worth is realized only once they are lost. Subject matter experts and specialists at the Air Force Center for Engineering and the Environment are dedicated to helping Air Force personnel recognize and support these ecosystem services at installations.

“Benefits from a healthy ecosystem have become such an inextricable part of daily life that people can have a tendency to underestimate or ignore them,”

said Ted Shierk, AFCEE landscape architect. “Much of the information revolving around our efforts, laws and directives in the areas of pollution prevention and environmental quality are justified by vague references and our failure to quantify the value of healthy ecosystem services in the planning, design, construction, operation and demolition processes.”

Shierk emphasized that knowing and understanding the services provided by healthy ecosystems is the first step in being able to appreciate them.

“Ecosystem services are the important environmental benefits that ecosystems provide to people and other species, including clean air to breathe, clean water to drink and fertile soil in which to grow crops, just to name a few,” said Dr. Paul Jurena, AFCEE ecosystem scientist.

In 2005, the United Nations Millennium Ecosystem Assessment, referencing the work of more than 1,360 experts, grouped the services provided by the environment into four broad categories: provisioning, regulating, supporting and cultural.

Healthy ecosystems benefit YOU...



U.S. Air Force photo by Senior Airman Julianne Showalter

PROVISIONING

- Fresh water
- Food
- Fuel
- Raw material
- Production
- Refuge/habitat



U.S. Air Force photo by Staff Sgt. Les Waters

REGULATING

- Climate regulation
- Air quality regulation
- Water regulation
- Erosion regulation
- Water purification
- Disease regulation



U.S. Air Force photo by Staff Sgt. Misty D. Slater

SUPPORTING

- Nutrient cycling
- Pollination
- Soil formation
- Soil fertility
- Waste treatment
- Water cycling
- Photosynthesis



Courtesy photo

CULTURAL

- Cultural diversity
- Aesthetic values
- Cultural heritage values
- Recreation and ecotourism
- Spiritual values

Provisioning services include such natural resources as fresh water and food supplies for humans and other living organisms, as well as raw materials such as fuel, wood and straw. Regulatory services can include atmospheric and climate regulation, flood control, sediment retention, and species and disease control, said Jurena. Soil formation, fertility and nutrient cycling are some of the services that fall in the supporting category, while the use of natural resources for recreation, aesthetics and cultural enrichment fall in the cultural category, according to the MEA.

Components of the ecosystem oftentimes contribute to more than one of the services simultaneously, said Jurena.

Native vegetation alone contributes to many of the services provided, he said. Vegetation reduces the amount of carbon dioxide, a greenhouse gas, while also helping to reduce facility energy requirements by providing cooling through shading and evapotranspiration, a term used to describe the sum of evaporation and plant transpiration from the Earth's land surface to the atmosphere. Native vegetation also naturally mitigates pollution, resulting in cleaner air and water, and provides habitat for wildlife,

contributing to biodiversity. Erosion and sediment control, reducing flooding and storm water runoff, are other benefits.

All of these life-supporting services are in a delicate balance, however, and conventional practices have often proven harmful to these ecosystems.

Incorporating sustainability into federal building and landscaping practices has significant positive impacts on the surrounding ecosystem, Shierk said.

According to the Federal Real Property Council, the federal government controls or owns more than 41 million acres of land, 429,000 building assets and 3.34 billion square feet in the United States, meaning federal practices alone have significant impacts on the environment.

The guidelines put forth in Executive Order 13514, "Federal Leadership in Environmental, Energy and Economic Performance," emphasizes that federal agencies must increase energy efficiency, reduce greenhouse gas emissions, conserve and protect water resources, eliminate waste and prevent pollution, and strengthen the sustainability of the communities where federal facilities are located.

AFCEE subject matter experts and specialists support many programs and initiatives geared at increasing sustainability in facility and landscape construction and operations across the Air Force, thereby supporting EO 13514, Shierk said.

Built infrastructure subject matter experts in the AFCEE technical division integrate sustainable design and development principles into all construction projects, and provide tools and education in support of the SDD program as well as the U.S. Green Building Council's Leadership in Energy and Environmental Design rating system. "Green" building minimizes the impact on the surrounding ecosystem and lowers the requirements for energy use.

Sustainability is an important consideration for landscape design as well, said Shierk. The sustainable sites initiative, an interdisciplinary effort by the American Society of Landscape Architects, the Lady Bird John Wildflower Center at the University of Texas at Austin and the United States Botanic Garden, has laid the groundwork to help transform land development and management practices, he said. Landscape architects at AFCEE seek to minimize impact on the local ecosystem by taking into account such issues as local climate regulation, potential for storm water runoff, local

habitat, erosion and sediment control, human health and well-being, and more.

Moving beyond facility-focused sustainability, AFCEE is also concerned with addressing the sustainability of an installation holistically, an initiative termed "sustainable communities." The effort incorporates environmental management system and asset management principles, and promotes continuous improvement in the sustainability of an installation. Christopher Kruzel, a mechanical engineer in AFCEE's built infrastructure branch, is spearheading the project, and is working to be able to demonstrate the ability to apply a standardized sustainability rating system to a DOD installation.

In addition to supporting sustainability in built infrastructure, AFCEE also has subject matter experts in the areas of air and water quality, natural and cultural resources, and pollution prevention.

Shierk explained that enhancing and protecting the natural ecosystem comes full circle as human and other species reap the benefits.

"The multitude of benefits achieved by a healthy ecosystem not only directly sustain the Air Force mission, but also have the added benefit of reducing base operating costs and energy expenditures," Shierk said. □



AFCEE subject matter expert takes work mindset home

By Debbie Aragon
Public Affairs

When it comes to work and home, many people say they strive to keep the two completely separate.

That's not the case for Kevin Gabos, an Air Force hazardous materials, hazardous waste and pollution prevention subject matter expert.

When at work at the Air Force Center for Engineering and the Environment, Gabos is focused

on analyzing hazardous material and hazardous waste data to identify pollution prevention opportunities to reduce the transfer and release of hazardous chemicals and waste to the environment. This includes deploying the Enterprise environmental, safety, and occupational health management information system, or EESOH-MIS, to enable each base to effectively manage its hazardous chemical materials and wastes, while providing data to AFCEE experts so they can look for opportunities to streamline and minimize Air Force waste generation.

He gladly carries his 'green' mindset home with him. "Even though hazardous waste regulations typically exclude household waste, that doesn't mean the environment can't be impacted by our use of cleaning products, lubricants, fertilizers and pesticides," Gabos said. "The main thing is to limit our use of these hazardous chemical items if possible. If not, we should look for 'greener' alternatives and local opportunities to properly dispose of unused hazardous material."

Common household items classified as hazardous materials and hazardous waste (when it's time to dispose of them) are paints, cleaning products, lubricants, fertilizers and pesticides, Gabos said, but that's certainly not all of them.

People might be surprised to know fluorescent lamps and many batteries contain metal compounds that are hazardous, he added.

According to the city of San Antonio's solid waste management website, it's important for people to properly dispose of household hazardous waste.

Household hazardous waste should never be disposed of in garbage carts, or poured on the ground, down the drain or in the storm sewers. Incorrectly disposing of household hazardous materials pollutes streams, lakes, wildlife and possibly drinking water.

As an example of what's happening in one major metropolitan area where AFCEE is located, approximately 80 percent of all materials collected through its household hazardous waste program are recycled, according to the city of San Antonio.

If possible, everyone should accumulate household hazardous waste items and attempt to recycle them at any city-wide hazardous disposal facility, Gabos said.

The HHW sites are free for city of San Antonio solid waste customers who pay an environmental fee. The fee appears on CPS Energy bills and indicates a customer is a San Antonio ratepayer. In order for residents to use an HHW facility to dispose of hazardous material at no cost, customers must bring a copy of their recent CPS Energy bill and a picture identification card as proof of residency.

To make it easier, San Antonio has household hazardous waste drop-off center located at 7030 Culebra Road. Customers can also dispose of household hazardous waste through seasonal facility and mobile collection sites citywide throughout the year.

The city of San Antonio offers the following guidelines for disposing of household hazardous waste:

- Keep the contents in its original container when possible.
- If the container is leaking or deteriorated, transfer the contents to a safe container and label the new container to correctly identify the contents.
- If the contents can't be safely transferred, double bag the old container in heavy duty garbage bags.
- Don't mix different materials in the same container.
- Place all items to be disposed of in a box and put the box in the trunk or truck bed when you're ready to take them to a HHW facility.
- Don't forget a copy of your recent CPS Energy bill and picture ID.

Visit www.sanantonio.gov/swmd/HazardousWaste/ for more information, including locations, hours and items that are and are not accepted.

"Even though hazardous waste regulations typically exclude household waste, that doesn't mean the environment can't be impacted by our use of cleaning products, lubricants, fertilizers and pesticides."

*Kevin Gabos
Subject matter expert*



For those who don't live in San Antonio, information on hazardous waste disposal is available at www.earth911.com.

To find out more about being Earth friendly in various ways, including hazardous waste disposal, Gabos recommends subscribing to the Environmental Protection Agency's Go Green monthly newsletter, at www.epa.gov/gogreen/.

"Each newsletter contains helpful hints and ideas for all of us to make a positive impact on our environment," he said.

He also recommended looking for Earth friendly packaging and labeling. The EPA's "Design for the Environment" safer product labeling program is one tool people can use to identify safer cleaning products. □



Site pollution resolved during construction on Travis AFB

By Lyn Garner
Housing Privatization Division

Under the Air Force Housing Privatization Program, project owners have delivered more than 25,000 new or renovated homes to military families. Many of the original houses were deemed inadequate by Air Force standards and had to be torn down.

One such construction project, which involved building new homes on top of old sites, presented a great challenge to the project owner.

In August 2008, Balfour Beatty Communities began construction of more than 350 homes at Travis Air Force Base, Calif. Four parcels of land were cleared of out-dated military construction housing to make room for the new privatization project. The aging structures were demolished at ground level. However, remnant infrastructure remaining in the ground included capped sewer, water and gas lines.

Once excavation began, the project director soon found abandoned water distribution pipes held toxic asbestos material. The polluted transite pipes were revealed as soon as the soil was shifted to begin construction.

"Almost from day one, motorized scrapers and other excavation equipment would uncover various amounts of transite pipe," said Mark Dupree, project director

with BBC. "Transite pipe was used a lot in the 1950s. It's not made anymore because of its potential for asbestos. We knew we had to investigate every section of pipe and eradicate pollutants where we found them."

Because the pipe is very solid, it meant there wasn't an airborne asbestos hazard and the pipe could be easily removed.

Whenever transite pipe was uncovered, the site was cordoned off and the developer's risk management coordinator was called in to investigate for asbestos. If asbestos testing was positive, the location would be mapped for remediation.

"Once we found an affected area, we notified the environmental office and called a certified asbestos contractor for removal," said Jeffery Brown, a senior construction manager for the 60th Civil Engineering Squadron at Travis. Each removal was carefully mapped, documented and mitigated in accordance with federal, state and local requirements. Once the transite pipe was removed, it was taken to a proper disposal site. All this happened as the scheduled construction continued to move forward.

"Balfour Beatty Construction was very proactive throughout the entire process," Brown said. "They conducted in-depth training with all the subcontractors on proper transite pipe identification and marking."

More than 30 sites on four parcels were successfully mitigated with no impact to the



Transite pipe uncovered during a housing privatization construction project. U.S. Air Force photo by Jeff Brown.

community or the project during the two and a half years of new construction. The cost of mitigation was \$46,850 and funded through the project contingency account.

The Travis homes were completed on schedule in 2010, and now flourish with Air Force families and activity.

“This project was a learning experience for the entire team in that we were able to effectively and efficiently mitigate all 34 findings without delays to the construction schedule,” Brown said. “And we now have a definitive plan for dealing with this type of pollution in the future.”

The handling of this situation and the way in which asbestos was eliminated illustrates how both BBC and the Air Force operate as partners with their housing community’s health and safety at the forefront of business operations. □



A Balfour Beatty risk management coordinator inspects a finding of transite pipe during a housing privatization construction project. The pipe was safely removed with no impact to the neighboring communities or the project. U.S. Air Force photo by Jeff Brown.



Contractors safely remove and bag transite pipe uncovered during a housing privatization project at Travis Air Force Base, Calif. U.S. Air Force photo by Jeff Brown.



going green starts with **DECONSTRUCTION**

By Robert Ginsberg
Capital Investment Execution Division

In an effort to support the Air Force's green initiatives, specifically the construction of environmentally sustainable installations, the Air Force Center of Engineering and the Environment's construction execution branch continues to analyze and refine its processes for executing demolition projects.

AFCEE program managers recently compiled what they called "valuable lessons learned" in an effort to communicate obstacles often

encountered during the demolition process; share tips to reduce costs, promote safety and address environmental concerns; and ensure their methods continue to adhere to the Air Force's deconstruction initiative.

Green demolition, often referred to as deconstruction, is a methodical approach that can be explained as construction in reverse. The idea is to dismantle buildings while preserving as much of the material as possible, with a goal of at least 50 percent. The preserved material is then re-used or recycled to reduce waste hauled to landfills.

"AFCEE's deconstruction methods are an enhancement to the traditional way of demolishing a site," said acting AFCEE execution division deputy chief Ben Kindt. "Instead of using a wrecking ball approach, destroying valuable construction material, deconstruction involves a systematic process of disassembling a building to increase the amount of material that can be recycled."

AFCEE's deconstruction process begins with a thorough survey of the construction site referred to as an intrusive survey. This survey includes analysis of the interior and exterior of the structure, taking into account subsurface elements such as electrical, sewer and water systems, and noting any hazardous materials.

Historically, Air Force surveying procedures are non-intrusive, relatively low in cost and minimize the impact on Airmen tenants and the operations of an installation. However, these types of surveys are believed to increase the risk of encountering environmental barriers later in the demolition process.

"Non-intrusive surveying usually opens the door for environmental concerns because they do not account for hazardous materials and other environmental concerns contractors typically experience in the demolition process including asbestos and lead-based paint," said AFCEE project manager Micah Shuler. "When these discoveries occur during deconstruction, it can delay a project several months while the appropriate surveys and sampling efforts take place in addition to the site cleanup."

AFCEE recently managed the demolition of an aging commissary at Peterson Air Force Base, Colo. The demolition project involved the removal and disposal of asbestos and leveraged a deconstruction approach to achieve a U.S. Green Building Council's Leadership in Energy and Environmental Design goal of repurposing

and recycling 50 percent of materials. Over 550 tons of steel were diverted from landfills and repurposed. The project surpassed the 50-percent goal in large part due to a creative backfill technique.

"In an effort to recycle as much building material as possible, we broke up and crushed the building's foundation concrete slabs and used the material for backfill," said AFCEE project manager Russell Henderer. "The backfill material was a green solution for providing a stable surface for future projects on the site."

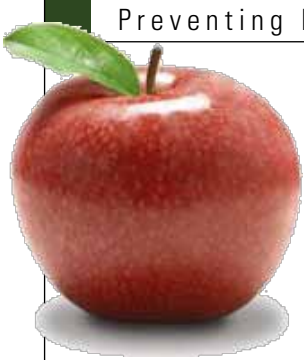
AFCEE is currently managing seven demolition projects and recycling continues to be a high priority.

"AFCEE recognizes the importance of construction and demolition waste management," Kindt said. "Our deconstruction practices directly support the Air Force's commitment to sustainable building." □



Contractors load recyclable material for transport. Over 550 tons of steel were diverted from the landfill and repurposed.

Photos by Daniel Sciarra.



KID POWER!

Tinker AFB and school partner up

By Karla Saia
Public Affairs

Thanks to a unique partnership between Tinker Air Force Base, Okla., and a local school, the loss of one protected wetland resulted in the creation of a large, thriving ecosystem and classroom for elementary school students.

Construction of a consolidated fuels facility at Tinker required removal of a small, federally protected wetland on the installation. Under the Protection of Wetlands Executive Order, the Air Force was then required to replace the habitat as part of its "no net-loss of wetlands" mandate.

After scouring the base, officials ruled out all potential on-base mitigation sites due to the high potential for aircraft bird strike hazards.

They then turned their focus outward to the neighboring community.

At the same time, officials at Grove Valley Elementary School in nearby Deer Creek were looking for partners to create an interactive, outdoor "wetland classroom" for students.

"The outdoor classroom provides an ideal structured learning environment for children and promotes ideal wildlife habitat," said Grove Valley Elementary School principal Debbie Straughn.

The two parties ultimately found each other and forged a partnership. Working with the Air Force Center for Engineering and the Environment, non-governmental organization, federal and community representatives,



they set to work constructing a replacement wetland.

In August 2010, Tinker's base commander Col. Robert LaBrutta signed a cooperative agreement with Land Legacy, Oklahoma's only statewide land trust, formalizing the base's partnership with Grove Valley, providing project funding and securing a conservation easement for the wetland development.

Construction, which began in January 2011, involved grading, dam construction, contouring and a massive effort to plant native aquatic plants along the three-acre wetland's shores and shallow zones.

They then held a "Marsh Madness" with more than 300 volunteers planting more than 1,500 plants from 20 different species. The U.S. Fish and Wildlife Service also stocked the wetlands with native fish.

Thanks to the efforts of more than 600 volunteers who donated approximately 2,300 hours of their time, Grove Valley was selected to receive the Department of the Interior's national 2011 Take Pride in America Award for outstanding school programs and its "outstanding commitment to public lands."

When accepting the award, the principal thanked the Air Force for its participation and said, the project "demonstrates how partnering activities can benefit both the military and the communities within which it resides."

In addition to providing a functioning, interactive environmental classroom, the installed wetland is nearly three times as large as the original on the base,

resulting in an environmental boon in terms of pollution prevention.

“Any time we can increase our nation’s wetlands, we increase our natural pollution prevention potential,” said Kevin Porteck, AFCEE’s natural resources subject matter expert. “Wetlands, and the microorganisms they house, are natural filtration systems for all kinds of pollutants that could otherwise degrade water quality.”

The classroom, which will be used for instruction this school year, is in late stages of completion, but will require regular monitoring and upkeep. Students will plant trees in the wetland this fall, and school officials are working to develop a maintenance club for nearby middle school children who were instrumental in developing the wetland classroom but didn’t have the opportunity to study in it. □

SCRAP METAL BRINGS IN BIG BUCKS\$

By Donald P. Chase
21st Civil Engineer Squadron

Getting rid of an empty soda can is easy. But how do you get rid of 15,000 tons of scrap metal that has accumulated for many years in less than 100 days?

This dilemma began 15 years ago with the demolition of fuel pipes and fuel tanks at Thule Air Base, Greenland. At the time, there was an empty space near Baffin Bay that would allow for temporary storage until the eventual removal of the scrap metal. The pile grew with demolished buildings, more tanks, more piping and any metal lying around.

It eventually reached a point that it covered a large area.

Funding was requested to remove the scrap metal, but higher priority funding requirements took precedence. When funding did become available, a contractor was selected. However, the contractor backed out when he realized he only had a few months to remove the metal and it could only be done by ship.

The scrap metal pile remained and continued to grow.

In 2010, the scrap metal market and especially steel recycling market prices began to rise with the price of a ton of steel at \$435. A plan was formulated that could use the Peterson AFB, Colo., qualified recycling program to sell the scrap metal in a lot sale. The QRP would prepare an invitation for bid, advertise it on the U.S. government’s contracting website FedBizOps, and see if any contractors were interested in buying the scrap metal. The stipulations included removing all scrap metal by ship in 100 days at no cost to the U.S. Air Force or U.S. government, and returning a percentage of the contractor proceeds for the scrap metal to the QRP.

Five bids were received, and the removal of the scrap metal was awarded to Aarsleff of Denmark.



From left) Col. Mark Allen, former Thule Air Base commander, receives a check for more than \$1 million from Torsten Thygesen, Aarsleff senior project manager, and Peter Riggelsen, Rimeco recycling company. The money was proceeds from a 15,000-ton scrap metal pile that had accumulated during the past 15 years at Thule AB. U.S. Air Force photo by Master Sgt. Jocelin Borisow

Background U.S. Air Force photo by Todd DeGarmo

They were able to insure payment for the metal prior to departing Thule and could remove it in one summer. Their equipment was already at the base and, with a few additional items, could begin preparing the metal for shipping as soon as the weather warmed up.

Work began in late April to prepare the metal for shipping. The first ship arrived July 7 and departed July 9 loaded with scrap metal. Prior to departure, Aarsleff's project manager handed over a check for \$1,026,906 to Thule AB commander Col. Mark Allen.

"It's been a pleasure to see a contractor like Aarsleff put so much effort into the cleanup with such a short timeframe to accomplish the work," said Master Sgt. Michael Jacobs. "They began organizing, cutting and preparing the scrap metal during the harsh parts of the winter to make sure their timeline for each ship was met."

The QRP has strict guidelines on how money can be spent. First it must be spent on recycling programs and

Thule doesn't have a formal recycling program. Next the money can be spent on pollution abatement, energy conservation projects, occupational safety and health activities, and morale, welfare, and recreation projects. Thule is currently developing a list of projects meeting these criteria to submit to the Peterson QRP committee to review and prioritize.

The removal of the scrap metal pile at Thule not only brought a cash return for the metal, it also removed an environmental safety and occupational health compliance assessment management program finding that had been active for a few years and shows that the U.S. Air Force is a caretaker of the environment and is doing its share in making this part of the world a better place to live.

In addition, the removal of the scrap metal has certainly improved relations with Greenland and the Danish government. □

EXPERTS IN THEIR FIELDS

The Air Force Center for Engineering and the Environment's 'think tank' includes several subject matter experts with a broad range of knowledge and expertise. This edition of CenterViews focuses on four of AFCEE's experts: Frank Castaneda, Kevin Gabos, Dr. Larry Isaacs and Kevin Porteck.

Frank Castaneda – Air quality

As part of the Air Force air resource management program, the Air Force Center for Engineering and the Environment's subject matter expert in air quality, Frank Castaneda, spends much of his time evaluating and developing protocols that allow the Air Force to identify, quantify and manage potential air pollutants that could adversely impact the Air Force mission.

"It's critical that we monitor and plan to sustain the airshed around every base," Castaneda said. "By proactively working to prevent pollution, we optimize the air's economic, ecologic and community value and, most importantly, we ensure regulatory compliance so we are not faced with any interference to the warfighters' operational requirements."

Since the accurate and timely collection, analysis and distribution of air quality and pollution prevention information is the keystone of the ARM program, Castaneda, who holds a bachelor's degree in chemical engineering and a master's in military operational art and science, is paying particular attention to next generation air program information technology efforts to integrate and standardize the best components of the Air Force's current tools for obtaining and reporting air quality data.

"Currently, there are several IT tools in use throughout the Air Force air program," Castaneda said. "Many of these tools require duplicate data entries and overlap in functionality, resulting in inconsistent data results across the Air Force. AFCEE has already initiated steps toward standardization by updating the air emission source guides



and developing an Air Force-wide database for all air inventory emission factors and algorithms.”

These guides and database, along with a single, streamlined IT air program tool and the Air Quality Playbook developed by Castaneda, will help move the Air Force beyond mere regulatory compliance to enhancement of all air resources at its disposal.

“The Air Quality Playbook, which addresses 65 unique air program processes and includes 40 in-depth narratives outlining policy and procedures, provides a solid base for air managers to learn and execute their programs at the installation level,” Castaneda said.

Kevin Gabos – Pollution prevention, hazardous waste, hazardous materials

Kevin Gabos, an Air Force Center for Engineering and the Environment subject matter expert, is at the forefront of unifying the Air Force’s pollution prevention effort. As a certified industrial hygienist, he has worked as an Air Force civil engineer for more than 25 years, 20 of which were spent as an active-duty bioenvironmental engineer. The depth and breadth of his experience makes Gabos uniquely qualified to streamline and centralize the pollution prevention program.

“Until recently, Air Force pollution prevention efforts were conducted at the local level,” Gabos said, with no way of taking a snapshot of Air Force-wide pollution data such as what facilities were using various remediation and prevention approaches, what approaches were working and which ones were cost effective.

“Our mission now is to capture and analyze that data so we can create a unified, strategic, long-term approach to Air Force pollution prevention,” he said.

Currently, the Air Force spends approximately \$50 million in pollution prevention each year and aims to reduce those expenditures by at least two percent annually.

“The P2 team is working toward that goal in a variety of ways,” Gabos said. “Right now, we are focusing on analyzing data behind current Air Force hazardous materials usage, waste generation and toxic release inventory so we can identify the right technological investments and comprehensive solutions to apply to pollution prevention across the service.”

Gabos, who holds a bachelor’s degree in chemical engineering and a master’s in industrial hygiene, is also working on standardizing how the Air Force identifies and disposes of hazardous materials and waste.

“There is a lot of information to collect and digest but AFCEE is making real strides toward defining the best tools and processes to help the Air Force limit – to every extent possible – release of pollutants into the natural environment,” he said.

Dr. Larry Isaacs – Water quality

It’s an inescapable fact that humans can’t survive without water. But neither, it turns out, can the Air Force.

“Water is critical for all Air Force activities,” said Dr. Larry Isaacs, AFCEE’s water quality subject matter expert. “Not only is it essential for people biologically, but it’s also used to collect and dispose of wastewater, cool mission operations equipment, provide irrigation for Air Force natural infrastructure, and wash and care for equipment, vehicles and planes.”

Isaacs leverages his extensive academic and practical knowledge of environmental science and electrical and environmental engineering to ensure the safety of the water



used across the Air Force. He holds a bachelor's in electrical engineering, a master's in environmental science and a doctorate in environmental engineering. He is also certified as a professional engineer in the state of New Mexico.

Currently, Isaacs is part of a proactive Air Force effort to inspect and repair close to 6,000 above-ground storage tanks, ranging in capacity from 50 to 55,000 gallons.

"The aim is to maintain a network of high-quality tanks that do not leak into our nation's rivers, lakes, streams or groundwater systems," Isaacs said. "Even small amounts of fuel or oil released into these bodies of water can have significant impacts, ranging from harm to aquatic organisms to adversely affecting water for recreational activity. Working with certified inspectors to regularly evaluate our ASTs ensures we identify potential problem areas early, prevent failure or leaks, and protect the environment while we serve our mission."

Isaacs is a member of the Air Force Water Program Panel, which consists of major command operations and environmental engineers who meet every other month to ensure Air Force water, wastewater and storm water program goals are on track.

Kevin Porteck – Natural resources

As AFCEE's resident subject matter expert in natural resources, Kevin Porteck plays a critical, if not always immediately obvious, role in Air Force-wide pollution prevention.

"Healthy ecosystems are extremely effective at mitigating pollution," said Porteck, an award-winning natural resources specialist with more than 30 years experience in the field.

Porteck develops guidance to ensure compliance with legislation aimed at maintaining the integrity of those natural filtration systems. His academic and practical backgrounds in forestry, agronomy and wildland fire management also contribute to his role in providing oversight of Air Force forest management and conservation programs. In addition to his years of experience, Porteck holds both a bachelor's and a master's degree in forestry.

"Thoughtful natural infrastructure management can assist in pollution prevention in a number of ways," he said. "For example, controlled burns in heavily forested areas can prevent large-scale wildfires. Our burns target underbrush while leaving the trees, with their ability to filter pollutants and aid in carbon sequestration, in place, while producing a fraction of a wildfire's smoke pollution."

Porteck has been at the forefront of several successful natural resources initiatives during his tenure at AFCEE, including the de-listing of the Okaloosa Darter Fish as an endangered species, and the Tinker Air Force Base and Grove Valley School Wetland Mitigation partnership (See Page 22). The partnership not only satisfied the federal policy of "no net-loss of wetlands," but also contributed to the creation of a state-of-the art learning environment.

"These projects are proof that endangered species and critical natural infrastructure can co-exist with the Air Force mission," Porteck said. "We prevent pollution, protect and re-invigorate species and habitats, and, as a result, gain more flexibility to use installation land for mission requirements. It's a win-win."

"This sort of collaboration is the most enjoyable part of my job," Isaacs said. "We have very competent, capable and energetic professionals managing Air Force water quality to support the mission, our people and our nation." □

Think Green, Build Green

Energy awareness, reduced usage daily endeavor at AFCEE

By Debbie Aragon
Public Affairs

Every October for more than 15 years, government organizations have partnered with businesses, associations and American citizens to promote public understanding of our energy needs and reduce energy consumption in our everyday lives during Energy Awareness Month.

Although Americans are called upon to focus on energy conservation for one month a year, subject matter experts in the Air Force Center for Engineering and the Environment focus on the topics of energy awareness and reduced consumption year round.

This is especially true in the area of military construction.

Chris Kruzel, a mechanical engineer in AFCEE's Technical Division, constantly sees how the Air Force is working to reduce energy consumption within the MILCON program – both new construction and major renovations.

"Much of what we're doing with regards to reducing energy consumption stems from the goals set for us in federal requirements," he said. One of the most prominent of those goals is to design a facility to

consume 30 percent less energy than one designed to meet the requirements of American Society of Heating, Refrigerating and Air Conditioning, or ASHRAE, Standard 90.1-2007.

"What's good about this goal is that it gives some level of freedom to designers to meet the intended performance—so we're not dictating design, rather we set the bar and ask them to give us a building that's designed to perform at that level," he said, "... you get a lot of innovation from designers that you may not ordinarily see."

For MILCON, AFCEE experts are incorporating the most life-cycle, cost-effective innovative technologies available to reduce facility energy needs.

A large part of the Air Force's plans for lowering energy consumption begins with the design stage.

"We now require the majority of our MILCON projects to include an energy model," Kruzel said. "The great thing about the energy model is that it provides a means to 'test' potential design solutions and see how they might work within the specific design."

One big caveat with energy modeling, however, is that it's not an absolute predictive model of what the utility



bills will be; focusing more on how the design of a building behaves in a controlled environment, Kruzel said.

“Experts in AFCEE’s Construction Management Division are also conducting studies on specific projects within the MILCOM program to understand what is required to reach even higher levels of energy efficiency and what renewable energy generation technologies can be utilized to bring us closer to zero net energy projects,” said Paula Shaw, U.S. Air Force Sustainable Design and Development program manager here.

In the area of electricity usage, the Air Force is using things like daylighting strategies, high-efficiency lighting and controllers on mechanical equipment such as variable speed drives, Kruzel said. Using sensors in conjunction with daylighting allows more natural light into an occupied space which reduces the amount of overhead lighting needed.

When it comes to heating water, the service uses the most efficient water heaters and, where cost effective, solar hot water heaters.

The approach to reducing energy consumption in the area of heating and cooling is entirely climate dependent, Kruzel said.

“Some climates can utilize high-efficient radiant heating and cooling, while others have to rely on conditioning the air itself,” he said.

In addition to energy usage reduction, the Air Force is also actively using and researching the use of renewable energy technology, Kruzel said.

Some of the methods for pursuing these technologies are through the Air Force Real Property Agency and the Air Force Civil Engineering Support Agency.

“They target a lot of the larger investments where the installation may partner with local utility companies or a third-party developer,” he said. “That approach really speaks to our size and how we manage our infrastructure—we use an installation perspective much more than an individual building perspective. While other agencies may own a single building, we own hundreds of buildings on hundreds of acres of land. That single difference gives us the ability to use our size to our advantage.”

“AFCEA and (the Air Force Research Laboratory)



Renewable energy sources, like these wind turbines, are one of the options installations across the Air Force are utilizing for ‘green’ energy. U.S. Air Force photo by Lance Cheung.

are partnering on an effort to provide guidance to the Air Force on technology maturity levels. The guidance would indicate which technologies are ready for widespread use on our installations,” Shaw added.

In addition to new technologies, Kruzel said the Air Force also relies on tried and true energy-saving options and techniques such as high-efficiency HVAC equipment, lighting controls and advanced control methodologies that match the HVAC output to the actual load of the building.

Though AFCEE engineers and contractors are hard at work to make MILCON construction and renovations as energy efficient as possible, their efforts are in vain if building occupants don’t understand how their actions impact energy use and take the appropriate actions, he said.

Similarly, it’s critical that building systems are maintained so they can perform at a high level of efficiency for a long time, he added.

“We construct the most energy efficient building possible,” Kruzel said, “but unless it’s operated and maintained as intended, the Air Force won’t get the payback that great design would normally provide.” □

AFCEE supplies MMR with clean energy

By Robert Ginsberg
Capital Investment Execution Division

Engineers at the Air Force Center for Engineering and the Environment are managing construction of two GE 1.5 megawatt wind turbines and a new substation at the Massachusetts Military Reservation. The \$9.36 million project is jointly funded by both the U.S. Army and the U.S. Air Force and directly supports local groundwater remediation efforts within the AFCEE Installation Restoration Program.

In 1989, MMR was placed on the U.S. Environmental Protection Agency's National Priorities List, as military use dating back to the 1930s had contributed to the contamination of the sole source groundwater aquifer, the primary drinking water supply for the surrounding towns and MMR. In 1996, AFCEE took the helm as the lead agent for the Installation Restoration Program, tasked with investigating and cleaning up contamination from past practices at Department of Defense sites.

The intent of the new clean power sources is twofold: to offset both the high electricity costs associated with MMR groundwater remediation systems and the air emissions produced by the power plants that supply the systems electricity.

"This alternative energy solution is imperative to improving the efficiency of the groundwater remediation systems here at MMR," said AFCEE project manager Rose Forbes. "The pump and treat remediation systems onsite are processing 13.1 million gallons of groundwater per day, consuming 10,862 megawatt hours per year. The new wind turbines, in conjunction with an existing wind turbine,



Above: Construction continues on two new wind turbines at Massachusetts Military Reserve, Mass.

Right: Contractors maneuver through the narrow construction site at MMR to install the wind turbine blades, completing the 390ft structure.

Photos by Scott DeHainaut.

are projected to produce 10,131 MWh of clean energy, offsetting annual energy use by nearly 93 percent.”

To reduce the impact on the surrounding natural resources at MMR, AFCEE focused on minimizing the site footprint during the design process of the wind turbine project. Operating in the reduced space was a challenge that required precision planning and logistics, as components of the wind turbines exceeded more than 250 feet in length. Fully assembled, each wind turbine stands approximately 390 feet tall.

Once complete, the installation will require minimal operations and maintenance interaction due to the advanced supervisory control and data acquisition systems within the wind turbines. Once the power produced by the wind turbines exceeds the power

required by the pump and treatment systems, other Department of Defense agencies may be able to utilize the energy surplus.

“The wind turbine project will allow us to continue our efforts of cleaning up the groundwater while greatly minimizing the dependency on fossil fuel power to do the job,” said AFCEE MMR remediation program manager Jon Davis. “It will also reduce costs to the American taxpayer and directly contribute to achieving the Air Force’s renewable energy goals.”

Congressman Bill Keating visited the construction site on June 28, proclaiming the importance of the project to the state of Massachusetts and voicing his appreciation of the renewable energy initiative. □



Construction is underway for two additional wind turbines at Massachusetts Military Reservation, Mass. Rose Forbes (right) received an individual award from the U.S. Department of Energy for her work to make the installation ‘100 percent on-site renewable’.

Air Force awarded for energy savings

By Margaret Breihan
Secretary of the Air Force Public Affairs

The Air Force was announced as the recipient of almost half of the U.S. Department of Energy Federal Energy Management Program’s 2011 Federal Energy and Water Management Awards earned by Department of Defense entities, and a quarter of awards overall.

The awards are scheduled to be presented during a luncheon Oct. 13 in Washington.

In addition, the Air Force more than doubled the combined total it earned for the past two years, three each for 2009 and 2010.

The Air Force took four team and three individual awards this year.

The awards, cosponsored by the DOE and Federal Interagency Energy Policy Committee, spotlight

federal organizations and individuals who make significant contributions to improve energy efficiency and water conservation. A primary goal of the program is to “recognize and encourage agency staff who are implementing game changing energy and water management practices that support meeting federal energy management goals,” according to DOE officials.

Air Force team program award winners are:

- The Vandenberg Energy Conservation Program, Vandenberg Air Force Base, Calif. Group members include 2nd Lt. Julian Vaiana, Scott Bly, Bradley King and Pernell Rush. The team saved more than 144 million Btus in energy and 336,000 kilo gallons of water through awareness and training programs, building retrofits, and innovative energy management and control systems.
- The Headquarters Air Combat Command Energy Program, Joint Base Langley-Eustis, Va. Group members include Steve Dumont, Mark Hunt, John McDuffie, William Turnbull and Steven White. The ACC team used a power purchase agreement to acquire a 14.5 megawatt photovoltaic array at Davis-Monthan AFB, Ariz., and installed smaller PV arrays at 14 bases by reusing excess solar panel equipment, which is expected to yield an estimated 582,536 megawatt hours in renewable energy over their life cycles.
- The Air Mobility Command Aviation Fuel Efficiency Program, Scott AFB, Ill. Team members include Col. Kevin Trayer, Lt. Col. Michael Lepchenske, Maj. Philip Morrison, Tony Hart and Rick Turcotte. The AMC team saved almost 48 million gallons of fuel in fiscal 2010 through policy changes, innovative data collection methods and focused culture change across the full spectrum of their operations.
- The Energy Efficiency Program, 171st Air Refueling Wing, Pittsburgh International Airport, Pa. 171st ARW team members include Brig. Gen. Roy Uptegraff, Col. David MacMillan and Lt. Col. Jeffrey Jones. The wing saved more than 1.5 million gallons of fuel in fiscal 2010 through leadership involvement, application of innovative tools and focused culture change.

Individual award winners are:

- Rose Forbes, Air Force Center for Engineering and the Environment, Massachusetts Military Reservation, Cape Cod, Mass. As the lead

environmental engineer for AFCEE’s Installation Restoration Program at the Massachusetts Military Reservation, Forbes is responsible for planning and initial implementation of an initiative that will result in “100 percent on-site renewable” status for the installation. One of three planned wind turbine generators is online now and, once the additional two go live, more than 6,600 metric tons of carbon dioxide greenhouse gas emissions will be eliminated per year. Lifetime cost savings exceeding \$68 million are also expected.

- Michael Miller, 92nd Civil Engineer Squadron, Fairchild AFB, Wash. As the energy management control system lead operator at Fairchild AFB since 1991, Miller has managed installation and operation of three energy management control systems on 110 buildings, accounting for 12 percent of Fairchild’s total decrease in energy intensity between fiscal 2003 and 2010.
- Clifford Richardson, 377th Civil Engineer Squadron, Kirtland AFB, N.M. Mr. Richardson spearheaded implementation of more than \$22 million in energy saving performance contracts at Kirtland AFB, saving more than 202 billion Btu per year and reducing energy consumption by almost 10 percent. Richardson also developed a water management plan that will save 62 mega gallons in groundwater annually. A luncheon to honor awardees is scheduled for Oct. 13 in Washington. □



Installations protect mission, feathered inhabitants

By Jennifer Schneider
Public Affairs

The burrowing owl is a little different from what many consider a typical owl; it isn't nocturnal and doesn't live in trees. Standing only about eight inches tall, the bird makes its home underground, typically taking residence in the holes of ground squirrels and prairie dogs in areas with sparse vegetation.

While once a common sight, the number of burrowing owls, two species of which occur in North America, has been declining in recent years. The Western Burrowing Owl and the Florida Burrowing Owl are considered by the U.S. Fish and Wildlife Service to be birds of conservation concern at the national level and are protected under the Federal Migratory Bird Treaty Act.

At the state level, the owls are listed as endangered, threatened, or as a species of concern in nine states.

According to the USFWS, the elimination of burrowing mammals through control programs and the consequential habitat loss has been identified as the primary factor responsible for the population decline.

Additional threats include predation, illegal shooting, pesticides and other contaminants.

Habitat loss due to urban sprawl has led many of the owls to seek refuge across vacant land at Air Force installations, with some of these installations having larger populations than many areas in the state. Nellis Air Force Base, Nev., is said to have the largest population of the birds in southern Nevada, based on data from the USFWS, said Bob Turner, the base's natural resources manager.

Similar situations occur at other installations.

"The state of Arizona considers them to be a species of special concern and treats them as threatened because their habitat is being encroached upon tremendously," said Gwen Lisa, natural and cultural resources manager at Davis-Monthan AFB, Ariz. "Consequently, their favorite place of residence has become airfields."

This poses a unique challenge for natural resource specialists, who must balance protection of the species with protection of the Air Force's flying mission, said Kevin Porteck, natural resources subject matter expert at the Air Force Center for Engineering and the Environment.

In response to the declining populations, natural resource specialists at several Air Force installations have engaged proactive strategies to help manage the species and reduce its impact on mission activities.

Identifying active nest sites and burrows is common practice across the installations.

At Homestead Air Reserve Base, Fla., which is home to the Florida subspecies, the owls tend to be year-round residents, using the same burrows for years. Nests and burrow locations are monitored regularly through the Bird/Wildlife Aircraft Strike Hazard program, with U.S. Department of Agriculture biologists and base natural resource specialists keeping a close eye on the birds' whereabouts.

"Their locations are noted by traffic cones to alert grounds maintenance and other workers of their presence," said Dr. Michael Andrejko, natural resources manager at Homestead. "The owls in turn use the cones as surveillance perches."

Eglin AFB, Fla., implements a similar technique.

"Active burrows are marked with a 'T-perch' using a PVC pipe and reflective tape," said Dennis Teague, Eglin endangered species biologist. "This helps range maintenance personnel avoid running over burrows while mowing or driving off-road, helps natural resource staff easily locate the burrows for monitoring and provides the owls with a convenient perch."

New Mexico is one of several states requiring a "safety zone" around active nest sites.

"Kirtland AFB has had to put some construction projects on hold until we were able to mitigate the owls from the area," said Carol Finley, natural resources manager at Kirtland. "During this time, we trap the owls and move them to a 'soft release' cage in the grasslands and prairie dog relocation sites on base where they stay for approximately a month to get used to their new surroundings. During this time, they are fed live mice and live in an artificial burrow. When they are ready to be released, we open one side of the cage and they are free to leave if they wish. They always hang around the area using their artificial burrow, as well as natural abandoned prairie dog burrows until it's time to migrate."

Schriever AFB, Colo., had a similar problem in 2009, when a pair of owls nested too close to the construction



"We've been monitoring the population since 1998, at which time we had 52 breeding pairs. We watched the population decline from 52 pair to 14 pair in 2001, then gradually increase again to 42 in 2007. Since 2007, they have gradually declined again to a historic low of only 11 breeding pair. Of these pairs, only two have fledged young due to predation by badgers, coyotes and mostly snakes."

*Carol Finley
Natural Resources Manager
Kirtland AFB, N.M.*

site of a child development center, forcing construction to be halted until the birds migrated that autumn, said Andrew Jensen, Schriever natural resources manager.

Because of the potential to delay or impede construction plans, installations impacted by the birds typically try to schedule construction outside of breeding season when feasible.

"We encourage construction on base, whenever possible, to occur during the non-breeding season so that there is no time lost to the project, and the owls aren't disturbed during their breeding and nesting process – a win-win situation," Finley said. "We also



Several predators prey on burrowed owls, including badgers, coyotes and snakes. The Nile Monitor Lizard, above, was introduced to Florida from sub-Saharan Africa and is threatening the population at Homestead Air Reserve Base, Fla. Photo by Ileana Burns.

distribute a weekly map of owl locations to our grounds crew and other folks who may potentially disturb the owls if their presence is not known. All active nest sites have colored pin flags in a 50-meter circle to identify their presence.”

Reestablishing habitat by creating artificial burrows for the birds is another effort several installations have undertaken.

“We have been successful in constructing artificial burrows at the test track area (at Holloman AFB, N.M.) and the owls actually use them on an annual basis,” said Lucas Oligschlaeger, natural resources manager at Holloman.

One of the biggest challenges, several installations agree, is combating predation.

“We’ve been monitoring the population since 1998, at which time we had 52 breeding pairs,” said Finley. “We watched the population decline from 52 pair to 14 pair in 2001, then gradually increase again to 42 in 2007. Since 2007, they have gradually declined again to a historic low of only 11 breeding pair. Of these pairs, only two have fledged young due to predation by badgers, coyotes and mostly snakes.”

Homestead ARB has become home to a rather unique predator, the Nile monitor lizard, Andrejko said. These predators can grow over seven-feet long and prey on the burrowing owls and their eggs, in addition to other small animals. The lizard, native to sub-Saharan Africa, has become established in the wild in Florida in recent years due to intentional releases or pet escapes.

Protecting the small birds has been a priority not only for the installations, but for the general public as well. Concern for the species in New Mexico has led to the creation of the New Mexico Burrowing Owl Working Group, a partnership of non-profit organizations, government agencies, private enterprises and individuals, who share a goal of promoting burrowing owl awareness and conservation in the state.

The “cute” factor tends to make the owls popular with local residents, Lisa said.

“People just fall in love with them,” she said. “As soon as the general public sees them, they immediately ‘adopt’ them and keep me informed as to their welfare.” □



Artificial burrows, like the one above, are used to provide a temporary home for burrowed owls that must be moved to new habitats in support of the installation’s mission. Photo courtesy of Kirtland Air Force Base, N.M.



By Summer Allen
Contingency Construction Division

AFCEE builds Pentagon equivalent for the Afghan military

Construction is underway in Kabul where engineers are erecting a new Afghan ministry of defense building.

The \$95-million project, spearheaded by the Air Force Center for Engineering and the Environment's contingency execution branch, is similar to the U.S. Pentagon.

The new facility will augment existing MOD facilities in the area and provide 37,000 square feet of office space for more than 1,500 personnel. In addition, the new five-story, reinforced-concrete superstructure will have conference rooms, offices, a media center, dining room and an auditorium.

The existing Soviet-era MOD building was unable to meet the military's space requirements. Since 2003, the Afghan National Army's workforce has increased by 164,000 with a projected growth of 260,000 by 2015.

"Currently, the Afghan MOD building is nowhere near meeting their current needs," said AFCEE project manager Capt. Ferdinand Maldonado. "It's about a third of the size of the building currently under construction."

The new MOD facility is designed to symbolize the Afghan National Army, providing offices for MOD senior leadership and support staff. It will also support two major security commands: the Combined Security Transition Command-Afghanistan and NATO Training Mission-Afghanistan.

The project is currently in the first of three phases and includes \$64 million solely for the construction of the MOD headquarters facility.

All phases of construction require open and frequent communication and collaboration between CSTC-A, AFCEE and the Afghanistan Ministry of Defense. In addition to the language barrier, security issues also presented a challenge for construction.

"Security is one of the main challenges; you never know when the ANA will lock down the entire compound for hours, sometimes full days, before allowing access again,"

said AFCEE in-country contracting officer's representative Capt. Walter Lee. "Also, you can never anticipate what to expect when it comes to ramping up security on the compound. The main thing is that you just go in there headstrong, mitigate these challenges as best you can and complete the job. This is the AFCEE/CX model. At the end of the day, you have a sense of fulfillment that you've done your best for your country and theirs."

Before beginning construction, contractors demolished seven existing buildings and provided temporary facilities for office space and dining.

The road leading up to the construction site was a heavily congested traffic area, with as many as 100 trucks hauling debris in and out of the area daily during the lifespan of the project. Also, access to the construction site was heavily controlled and monitored due to recent terrorist attacks.

As with state-side military construction projects, building "green" was a part of this build as well.

A materials were reused and salvaged for use in other facilities nearby. Contractors were able to reclaim doors, windows, brick and metal siding for example to be used again. Additionally, a state-of-the-art heating and air conditioning system has been set in place as a change to the standard seen in most stateside buildings. This system uses small separate units to heat and cool spaces without the use of boilers, equipment and accessories.

"Moreover, this eliminates the need for excessive amounts of ducting and equipment, saving space," Lee said. "It's nearly maintenance-free and allows for easy access to each separate unit without compromising the entire system by shutting it partially or completely down for maintenance."

"Short term, this system costs about the same as the typical. However, over the course of the building's life span, it will reap significant cost savings for the local government thus minimizing its energy-resource footprint," he added.

"Similar to other large scale construction projects on foreign soil, this project had its share of challenges," said AFCEE security transition support branch chief Lt. Col. Anthony Dudley. "However, it was an honor to be able to make an impact on the Afghan government in a positive way." □

HQ AFCEE/OSR
2261 Hughes Ave, Ste. 155
Lackland AFB, TX 78236-9853

OFFICIAL BUSINESS

PRSTD STD
US Postage
PAID
Permit #382
Dulles, VA



A base civil engineer at Travis Air Force Base, Calif., inspects transite pipe uncovered during a privatized housing construction project on the base. The sites were mitigated with no impact to the community or project. See related story on page 18.